

# Earth's Fiery Secrets: Layers and Volcanoes

## Lesson Overview

**Target Age:** 8 Years Old (Year 3)

**Student:** Pragati

**Duration:** 60-90 minutes

**Lesson Goal:** To understand that the Earth is made of different layers and to discover how pressure in those layers leads to volcanic eruptions.

## Materials Needed

- **For the Earth Model:** 4 colors of playdough or modeling clay (Yellow, Orange, Red, and Brown/Green).
- **For the Volcano Experiment:** A small plastic bottle, a tray or baking sheet (to catch the mess), baking soda, vinegar, red food coloring, and a squeeze of dish soap.
- **Visual Aid:** A hard-boiled egg (unpeeled).
- **Writing:** Paper and markers for labeling.

## Learning Objectives

By the end of this lesson, Pragati will be able to:

1. Identify and name the four main layers of the Earth: Inner Core, Outer Core, Mantle, and Crust.
2. Explain that the Earth's crust is made of moving pieces called tectonic plates.
3. Describe how "magma" turns into "lava" during a volcanic eruption.
4. Demonstrate a chemical reaction that simulates a volcanic eruption.

## Success Criteria

- I can name the four layers of the Earth in order from the inside out.
- I can explain which layer is the hottest.
- I can build a model volcano that "erupts" using a chemical reaction.

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## 1. Introduction: The Mystery of the Deep (The Hook)

**The Scenario:** "Pragati, imagine you have a giant drill that could go all the way to the center of the Earth. Do you think it's just dirt and rocks the whole way down? Actually, the Earth is like a giant piece of fruit with a pit, or a hard-boiled egg!"

**The Demonstration:** Show Pragati a hard-boiled egg.

- The **Shell** is like the Earth's *Crust* (thin and breakable).
- The **White** is like the *Mantle* (thick and heavy).
- The **Yolk** is like the *Core* (the very center).

## 2. Body: I Do, We Do, You Do

### Part A: The Layers of the Earth (I Do / We Do)

**Instruction:** Explain the four layers using the "Playdough Method."

- **Inner Core (Yellow):** A solid metal ball that is as hot as the surface of the sun! *Action: Roll a small yellow ball.*
- **Outer Core (Orange):** Liquid metal that flows around the inner core. This creates the Earth's magnetic field. *Action: Wrap orange playdough around the yellow ball.*
- **Mantle (Red):** The thickest layer. It's made of hot, gooey rock that moves slowly like thick syrup or toothpaste. *Action: Wrap a thick layer of red around the orange.*
- **Crust (Brown/Green):** The thin, cool outer layer where we live. It's broken into pieces like a jigsaw puzzle. *Action: Wrap a thin layer of brown/green around the outside.*

**The Big Reveal:** Use a plastic knife to cut the playdough ball in half. Pragati can now see the cross-section of the Earth!

### Part B: Why Do Volcanoes Happen? (I Do)

**Instruction:** Explain that because the Mantle is so hot, it creates gas and pressure. When the "jigsaw pieces" of the Crust move or rub together, that hot gooey rock (called **Magma**) finds a weak spot and squeezes out. Once it hits the air, we call it **Lava**.

### Part C: The Volcano Lab (You Do)

**Independent Practice:** Pragati will now build and erupt her own volcano.

1. **Build:** Place the plastic bottle on a tray. Use the leftover playdough or dirt from the garden to build a mountain shape around the bottle. Leave the top (the "crater") open.
2. **The Mixture:** Scoop 2-3 tablespoons of baking soda into the bottle. Add a few drops of red food coloring and a squeeze of dish soap (this makes the "lava" extra bubbly!).
3. **The Eruption:** Pour in the vinegar and watch what happens!

## 3. Conclusion: Review & Recap

**Summary:** Ask Pragati to "teach back" what happened.

- "Which layer of the Earth did our baking soda 'magma' come from?" (The Mantle)
- "What happened to the 'lava' as it flowed over our playdough crust?"

**Creative Reflection:** Have Pragati draw a picture of her volcano and label the *Crust, Magma, and Lava*.

## Assessment

**Formative Assessment (During the lesson):** Check if Pragati can identify the layers while building the playdough Earth. Can she explain why the Inner Core is yellow (heat)?

**Summative Assessment (End of lesson):** Provide 4 sticky notes with the names of the layers. Ask Pragati to place them correctly on her cut-open playdough model. If she can place 4/4 correctly and explain that volcanoes happen because of heat and pressure, the objective is met.

## Differentiation & Adaptations

- **For Advanced Exploration:** Research the "Ring of Fire" on a world map to see where most volcanoes are located.
- **For More Support:** Use a pre-printed diagram of the Earth for Pragati to color in while you discuss the layers, focusing on just the names of the layers.
- **Sensory Option:** If playdough is unavailable, use a clear jar with oil, water, and food coloring to discuss how different liquids (layers) sit on top of each other.